HEAT EXCHANGER STAND 6-11-2001 BERGES 13/

Calculating the Radius of Curvature

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Formulas for obtaining the radius of curvature of any square structural tubing section.

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$p = 3.14159265359$

Area of the "big" square.

$((4-2r)\hat{}2 + 4r(4-2r) + pr\hat{}2) = (4-2r)^2 + 4r(4-2r) + 3.141593r^2 = 16.0 - .858407r^2$

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Area of the "small" square.

$((4-2r)\hat{}2 + 4(r-T)(4-2r) + p(r-T)\hat{}2) = (4-2r)^2 + 4(r-T)(4-2r) + 3.141593(r-T)^2 = 16.0 - .858407r^2 - 16.0T + 1.716814Tr + 3.141593T^2$

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Area of the "big" square minus the area of the small square= area of the section

$16.0 - .858407r^2 - (16.0 - .858407r^2 - 16.0T + 1.716814Tr + 3.141593T^2) = 16.0T - 1.716814Tr - 3.141593T^2$

$16.0T - 1.716814Tr - 3.141593T^2 = A$

$r = .5824743\frac{16.0T - 3.141593T^2 - 1.0A}{T}$

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For $T = 3/16$, $A = 2.77$

$r = .5824743\frac{16.0T - 3.141593T^2 - 1.0A}{T} - .3713961$

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For $T = 1/4$, $A = 3.59$

$r = .5824743\frac{16.0T - 3.141593T^2 - 1.0A}{T} = .4977836$

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For $T = 5/16$, $A = 4.36$

$r = .5824743\frac{16.0T - 3.141593T^2 - 1.0A}{T} - .6210645$